WORKING WITH CONSTRAINTS

Abstract: Constraints are usually understood as restrictions (imposed by laws, regulations, or even by the site itself – by its conformation, by its surroundings). Sometimes they are the limits imposed or demanded by stakeholders (from a minimum height, to a maximum budget, etc.). In any case, giving constraints a positive connotation and treating them as assets can lead to designing an innovative, representative and remarkable architecture, with a high impact at various scales.

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Introduction

Any discipline works within its own constraints. Architecture, through its implications in practice, deals with an array of constraints ranging from normative, to economic, technological as well as, in certain situations, socio-cultural. Some are imposed – like those required by law and regulations; others are a result of certain conditions – like those dictated by where and how the site is located, by context or by the technological limitations; and others are requested by beneficiaries, investors, or stakeholders given their economic capabilities, demands and needs that led to commissioning the design of the building.

This chapter is an investigation of these constraints and of ways to avoid errors in design determined by a rigid way of thinking that see constrains not as limitations that can be creatively interpreted, but as unchallengeable impositions, with deeply negative connotations. In an actual situation, various types of constraints combine and that challenges the architect to navigate through them and to respond to all of them while still delivering a good design. Anyway, while some cannot be avoided, others, even some of those imposed, can be negotiated with authorities, stakeholders or other deciding parties. Such a negotiation requires arguments and demonstrations that the proposed situation will have a high positive impact upon the area or even the city, upon the community, or for the investment. However, determining the relation between the changes advocated for and the implications of convening certain deciding parties is very important, as often costs and time delays must be seriously taken into consideration.

The majority of constrains should be known from the beginning and already solved in the conceptual phase of a project. Otherwise, major issues could make the design impossible to authorize and/or build. The project should be developed knowing the actual possibilities of development and implementation, but no matter how strict the constraints are they must not be regarded as an impossibility to be creative. Plowright (2014) even considers constraints as assets when they are treated as beneficial forces that inform the design. The most creative designs transform constraints into features, using them to underline particularities of the site: they overturn them into elements that confer the building its special character, by not only overcoming the difficulties, but by also correctly solving issues in a creative and innovative manner.

In the following sections we shall go through the three main types of constraints we identified: (1) imposed by laws and regulations, (2) dictated

by site and program, and (3) constraints framed by the requirements of the commissioning parties. We shall discuss their particularities, but also their degrees of freedom and possibility of being negotiated. In parallel, we will analyse examples of creative and innovative solutions, advocating for the architect's responsibility of designing buildings that, despite the various constraints that must be regarded, "do" more than their primary function – buildings that become icons for the community they are part of, buildings that have a positive impact and even change the quality of life for its users, buildings that are healthy, sustainable, inclusive, etc. (Sfintes, 2022).

Constraints imposed by laws and regulations

Laws and regulations are the most restrictive constraints. They keep their mandatory character due to their role. Laws ensure justice for all the members of a country or community through rules that follow sets of values recognized at a local, national, supranational (as in the case of laws imposed by EU) or international level. Regulations, in the case of architecture, impose minimal standards to be respected in order to assure the conformation to the accepted parameters of building and of building behaviour, in the end protecting both the direct and indirect users in various circumstances influenced by design, construction and design in use. They are not negotiable, but on the other hand they are, or should be, constantly updated to keep up with the changing society, state of development, technological advancements, etc. Changing situations open regulations up for debate and amendments, but the changes made to laws and regulations should be valid at the full scale of their extent. We give two opposite examples regarding the update of regulations. In Romania, regulations are not updated regularly. The oldest norm in place is from 1982 and it is a regulation regarding the provision of elevators in residential, socio-cultural, tourism and administrative buildings (P92-1982 Normativ privind dotarea cu ascensoare a clădirilor de locuit, social-culturale, de turism și administrative, 1983). Even when norms are updated, many stipulations can be contested, all the more so as there are around 90 active regulations in architecture. What is worse is that they are not correlated, this leading to confusing situations of not knowing what to respect or when - as, for example, in the case of the regulation regarding the design, construction and operation of constructions for kindergartens (NP 011-2022 Normativ privind proiectarea, realizarea și exploatarea constructiilor pentru grădinite de copii, 2022) and regulation concerning the specific performance criteria of ramps and stairs for pedestrian circulation in buildings (NP 063-2002 normativ privind criteriile de performantă specifice rampelor și scărilor pentru circulația pietonală în construcții, 2002). NP063-2002 stipulates minimum heights of interior stairs handrails of 0,90m for levels at more than 4m above ground (Art. 2.2.1.6.a). NP 011-2022 requires a handrail of minimum 1,25m in case of free standing stairs (Art. 4.2.1.2(35)). In USA, there is a much smaller number of regulatory documents: for example, there is an International Building Code, an International Existing Building Code, an International Fire Code (International Code Council, n.d.) and each is updated every 3 years. Thus, it is easier for the designers to access the latest norms in place and to make sure that they refer to all the norms that apply in a certain situation.

In any case, even if in the case of Romania it can be more difficult, laws and regulations do change and their update requires research as well as a deep understanding of current situations, problems, and possibilities. Their change requires adaptation to current realities, but also preventive and anticipative thinking. In this case, the architects should engage in the research and development of the new stipulations, to be active and participate to debates, feeling responsible to represent the interests of the profession, but also of the potential users of their architecture.

Constraints dictated by site and program

Site and program are the main elements the architects operate with. Designs are most of the time site-specific and that entails a deep reading and understanding of the context. Architects can relate differently to various specificities considered relevant or important in the particular context of the commissioning, but also as a specific way of approaching architecture. Architects' biases influence the approach, underlining creativity as an individual trait. They have the freedom and tools to interpret and negotiate these specificities through design – relating architecture and its components for example to topography, climate, cardinal directions, etc. However, other specificities impose limitations and here we speak of regulations that apply particularly to the site – the urbanistic regulations, or dictated by the program – design norms.

The former can sometimes be contested and changed (in Romania maybe easier than in other parts of the world), usually with extra costs indeed, for example: the edification limits, the building height, the building coverage ratio and floor area ratio. On the other hand, such constraints can lead to most interesting, creative and innovative designs just by transforming constraints into traits. They pave the way towards a building that has architectural identity, proving as an excuse the assertion that rules and regulations are too restrictive.

Plowright (2014) gives as a good example in this case Mineral House by Yasuhiro Yamashita and Yoichi Tanaka/Atelier Tekuto where the architects interpreted the slant plane restrictions into particular relationships with the surroundings (Fig. 1). They overturned a restrictive situation through architecture understood in its poetics dictated by natural light: "Thinking about light as an asset allows the designer to consider it in more sensitive ways, instead of simply allowing the physical nature of sunlight regulations or shadow considerations to shape exterior massing." (Plowright, 2014, p. 192). Plowright mentions architecture studios like OMA, Foreign Office Architects, MVRDV, BIG, etc. as studios deeply involved into research and analysis of constraints and of ways they can be transformed into assets: "The content generated is then explored and resolved in order to produce radical but rational innovation in their design work" (Plowright, 2014, p. 43).



Fig. 1. The Mineral House by Yasuhiro Yamashita and Yoichi Tanaka/Atelier Tekuto. Sketch by Anda Sfinteş

Another challenging example is Vancouver House, a tower developed by BIG in Vancouver, Canada (Fig. 2). The project could have been abandoned almost from the beginning, following the site regulations that demanded a 30m setback from the bridge and other stipulations that left, on the ground, "a small triangular site nearly too small to build on" (*Vancouver House*, n.d.). The sculptural shape of the tower proposed in the end is, in fact, the result of ingeniously understanding these regulations – that the 30m setback from the bridge apply just until the building reaches 30m up in the air. So, "the surreal gesture is in fact a highly responsive architecture – shaped by its environment" (*Vancouver House*, n.d.).



Fig. 2. Vancouver House by BIG. Sketch by Anda Sfintes

We would like to end this topic by highlighting the fact that, although regulations aim to protect the interests of the city and its inhabitants, sometimes they stop developments that would bring great value to both. We give as an example a project that asked students in the 2nd year of study at the Faculty of Architecture, "Ion Mincu" University of Architecture and Urban Planning in Bucharest, Romania to propose a row house on a 6.5m wide and 30m long site, considered unbuildable in Romanian legislation due to its narrowness. The exercise led to highly different and creative solutions that, at the city level, filled in a void while, for the potential inhabitants, offered less common scenarios of use (for example by interpreted ways of access to rooms that no longer could be put in usual relationships to each other, or by transforming the courtyard into a "room"). Yes, such houses are not suitable for anyone, as they imply assuming a certain way of living. Still, when they are particularly designed for certain persons, considering their needs, dreams, and characters, they can become part of their common identity. In such cases, the entire concept builds upon the constraint itself and even gains meaning.

Requested constraints

The requests made by commissioning parties can be considered constraints when they are hard to implement, especially if they are against laws, regulations, or norms. Of course, the architects must inform parties about such conflicts and discuss the real possibilities of building. As stated above, some issues can be interpreted, negotiated, and surpassed through creative and innovative thinking, or even by amending the regulations and norms. The entire design team (including collaborators) is, however, responsible of appreciating what such modifications could imply, as well as of being capable of demonstrating that the changes have a positive impact. This can sometimes be a huge challenge, as the team might find itself to be torn between the responsibilities towards the commissioning parties and the responsibilities of the profession, on top of ethical considerations.

Anyway, the most common requested constraints are rather those related to costs and time. They might not be so problematic, but rather undesired by architects that would like to have a free hand in proposing great designs, as they see them. Such constraints become problematic the bigger the unbalance between needs, effort, design challenges and needed money and time, not to mention the possibility of situational issues occurring, leading to liability claims (Burgoyne, 2019). However, we would like to direct the discussion towards a crucial problem when it comes to working with constraints. We consider that the biggest challenges are those of helping people who do not have the possibilities of meeting their basic needs of shelter. Sometimes the state has in place policies of building for scarcity and accommodating the needs of vulnerable persons. Sometimes such needs are addressed by NGOs, or even by physical persons. In such cases, costs and rapidity of construction are the main constraints. Thus, it is hard to propose buildings that possess qualities assumed by good architecture (both functional and, even more so, aesthetic). However, numerous contests dedicated to this subject, as well as numerous interventions prove the concern of addressing and solving these issues. In the same time, well recognized examples like buildings developed by Alejandro Aravena (Elemental) or Francis Kéré (Kéré Architecture) are proofs that good designs can come alive even from scarcity. We must, however, highlight that in these case the design is also related to the need felt by the architects to lead, through architecture, to social and cultural change. The extreme challenges in this context remain the designs that approach conflict areas and crisis situation, speaking of the responsibility "to engage the socio-political and economic domains that have remained peripheral to the specialisations of art and architecture, questioning our profession's powerlessness in the context of the world's most pressing current crises", as Teddy Cruz (2016, p. 205) states.

Following this thought, but in more common situations, we consider that when it comes to constraints imposed by stakeholders, the challenge for the architects rather resides not only in respecting those limitations, but in working within them and trying to give more back. We speak of the architects' responsibility towards society at large, no matter the project, of the need to attain sustainability and the need of being socially responsible (Sfintes, 2023). More than that, James Soane (2019) says (in what can be seen also as a critique addressed towards architects that dream of doing starchitecture) that "The new story of our profession needs to be one that builds a better habitat for everyone, enhancing community engagement over the singularity of the architect's vision and bringing with it economic, political and environmental evolution." (p. 219).

Conclusions

In fact, almost anything can become a constraint if it is regarded as such – as an unavoidable condition that imposes restrictions which cannot be ignored.

In this paper we advocated for treating constraints rather as challenges for finding creative and innovative solutions. When regarded as particularities (with a positive connotation), the solutions found to constraints become statements of identity. Such solutions are proof that approaching constraints with courage and determination can not only solve a problem, but become a way of giving back something more - to the city, to the community or at least to the users of the building. Such projects are inspiring and transformative, triggering various developments as the solutions can sometimes require progress and advancement in various sectors, not only in design, but also in construction: new techniques or technologies can be developed. Constraints are also a matter of capability. For example, due to limited competencies of architecture firms that try to design details beyond their capabilities, collaboration with other firms is required like in the case of Soumaya Museum in Mexico City designed by FR-EE Fernando Romero Enterprise; the complicated façade was supposed to be designed by Gehry Technologies, but it proved to be more challenging than anticipated and ended up being solved by Geometrica (Zwicker, n.d.). Anyway, in the context of discussing constrains, we should also note that companies like Gehry Technologies were set up in the first place with the purpose of overcoming technological issues and being able to carry out innovative designs. This is just an example, trying to prove the point.

The chapter itself wishes to be an encouragement addressed to many that feel threatened and stuck when facing apparently adamant restrictions or demands. Some see site, regulation and budgetary constraints as limits and they don't even try to challenge them ...and yes, it's not always the case. Yet, other times, challenging them can make a big difference.

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